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Machinery Management

Farm machinery and equipment are essential to the operation of most farm and ranch businesses. U.S. farm machinery and equipment are currently valued at nearly $75 billion, ranking only behind farmland as the most valuable asset in U.S. agricultural operations.

Agriculture is one of only a few industries that uses such capital-intensive machinery for such short periods of time. It is not uncommon for farmers to own combines valued at $60,000 or more, yet use them for only 12-15 hours per day for 10-20 days per year. Such large expenditures appear to be justified because of the potential for high losses from a late harvest.

In some countries, such as Argentina, land holdings are large and expensive capital assets are used round the clock during critical planting and harvesting seasons. This helps lower per acre costs and makes the farming operation more cost competitive.

Proper machinery management can improve the efficiency of farming operations and, thereby, increase the incomes of agricultural producers. When making machinery management decisions, the farm manager needs to consider capacity, ownership and control, maintenance, and replacement.

Capacity

To determine a farm's optimal machinery capacity, the farm manager needs to know the acreage of each crop to be produced; the tillage, planting, and harvesting operations; costs of various types and sizes of machinery; labor costs; and the costs of untimely operations.

Determining optimal capacity is not an easy task. The decisionmaking process is complex. A number of decision-aid tools are available through the Cooperative Extension Service and private software vendors. In recent years, microcomputer programs for selecting farm machinery have been developed at a number of universities. These programs offer valuable assistance in determining optimal capacity.

Ownership and Control

A critical decision faced by the farm manager is how best to control the use of farm machinery and equipment. Control alternatives include purchase, joint

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ownership, financial lease, operating lease, and custom hire. Each alternative has advantages and disadvantages; no alternative is likely to be best for all situations. The astute manager needs to determine which alternative is best for his or her own operation.

Purchase. The most common method of acquiring farm machinery and equipment is to purchase it. The benefit of purchasing is that the owner has complete control over use of the equipment; however, the owner also has complete responsibility for the equipment's maintenance. Before purchasing, the farm manager should determine whether the farming operation can support the purchase with cash or borrowed funds. If so, the manager should seek the most satisfactory financing arrangement

Joint Ownership. One method of reducing machinery and equipment costs is joint ownership. Joint ownership is most common among relatives or close acquaintances. A successful joint ownership is dependent on a clear and documented understanding of each owner's rights and responsibilities. The time the machinery is available to each party, who is responsible for maintenance and storage, and compensation agreements (if one party uses the machinery more than originally planned), should be determined and put in writing before the purchase is made.

Financial Lease. Another method of controlling the use of machinery is through a financial lease—a long-term contract in which the farmer has exclusive use of the machinery over a significant portion of its useful life. Financial leases were once motivated by tax considerations. However, tax incentives for financial leasing have been reduced. Financial leasing now appears to be attractive because of the implied fixed rate of interest as a part of the lease agreement (as opposed to a variable interest rate loan for a purchase with borrowed funds) and because the upfront cash needed to lease may be less than the upfront cash needed to purchase. Financial lease contracts are commonly available on big-ticket items such as combines, tractors, and irrigation equipment.

Operating Lease. An operating lease is an arrangement whereby a producer can rent equipment on a short-term basis—hourly, weekly, or monthly. An advantage of an operating lease is that high-cost equipment needed for a short time period can be made available at a lower cost than ownership. A disadvantage is that equipment may not be available when needed. Transporting the equipment may also be inefficient and time-consuming.

Custom Hiring. Custom hiring can be a good choice when you need high-cost or specialized equipment for a short period. By offering services to many farmers, custom operators can spread the cost of machinery and equipment over many acres. For example, some custom combine operators start in Texas and follow the wheat harvest north to Canada. Custom hiring also can be attractive if labor is scarce. Farmers with excess machinery capacity may find it profitable to offer custom services to others who may lack adequate machinery capacity.

Which Option Is Best?

Three criteria can be used to determine which method of controlling machinery and equipment is best for a particular operation—cash-flow feasibility, capital debt repayment capacity, and net present value.

Cash-Flow Feasibility. Cash-flow feasibility tells a manager whether the farming operation is generating a sufficient amount of cash to meet the payments required by a given acquisition method. For example, it may be better

from a profit standpoint to purchase a combine rather than to lease it. But if the purchase requires a large cash down payment, it may not be feasible from a cash-flow perspective. The cash down payment may deplete operating capital or funds needed for other business decisions. A cash-flow projection can be used to help evaluate cash-flows under each acquisition method.

Capital Debt Repayment Capacity. Capital debt repayment capacity measures the ability of the farm to generate enough profit (but not necessarily enough cash) to support machinery acquisition. Agricultural lenders have come to rely heavily on capital debt repayment capacity measures in evaluating loans for the purchase of machinery. Capital debt repayment capacity measures can help avoid costly problems which may arise in farming operations prone to purchasing machinery when "cash" is available but when profits in the business are lacking. Agricultural lenders or farm finance textbooks can provide additional information on how to measure capital debt repayment capacity.

Net Present Value. Net present value calculations provide a mechanism for a direct comparison of one acquisition method versus another. The net present value approach is simply one of taking all cash inflows and all cash outflows associated with an investment and discounting them back to the present. While useful in sorting out the best alternative, this approach often overlooks the issues of cash flow feasibility and capital debt repayment capacity. Most farm management and agricultural finance textbooks cover the mechanics of doing net present value calculations.

This prototype kenaf harvester, specially designed to cut whole kenaf stalks into 12-foot lengths and place them in windrows, was built mainly from combine parts readily available from local farm equipment dealers. (USDA Photo by Ron Nichols, 88BW1890-8)

Taxes and Machinery Management

Tax considerations often influence farmers' machinery investment decisions—sometimes more than they should. Consider the case of Joe, a large dairy farmer who did not like the idea of owing income taxes at the end of the year. Joe made a practice of carefully estimating tax liabilities several weeks before the end of each year. If it appeared that taxes would be due, Joe would buy enough machinery to generate sufficient investment tax credit to offset any tax liabilities. While Joe never paid year-end income taxes and had a large fleet of relatively new machinery and equipment, he also had a correspondingly large amount of debt. Joe went bankrupt. While tax considerations do affect machinery investment decisions, they should not overshadow common sense.

The 1986 Tax Reform Act made numerous changes to the tax code that were designed to reduce tax incentives for investments in agricultural assets. It appears that those changes have been successful. However, farmers and ranchers still have a variety of tax incentive

options—including three different depreciation methods and a choice between expensing and not expensing the first $10,000 of machinery investments each year. In most circumstances, the depreciation and expensing options that allow for the most rapid charge-off are preferred.

Machinery Maintenance

Strategies for reducing repair and maintenance costs are an important component of many successful farming operations. Keeping machinery in top working order often involves a tradeoff between time and labor costs and the potential losses resulting from untimely breakdowns. Many farmers have become excellent mechanics, doing most of their own repairs and maintenance. The alternative is to rely on dealers or trained mechanics to handle the necessary repairs and maintenance.

In determining the value of doing his or her own repairs, the manager should consider several factors. First, proper repairs may require the purchase of special tools and equipment. Second, repairs require time; therefore, consider what the manager or employee could be doing instead of spending time on repairs. Some farmers have increased profits by handling only basic maintenance while relying on dealers or trained mechanics to provide major repairs and overhauls.

Creative strategies to address specific repair and maintenance needs should not be overlooked. For example, Tom is a large-scale grain producer who found that it pays to shop around for parts. Each winter, he lists all the parts he expects to need during the coming year. He then takes this list to 4-6 dealers for bids on the entire list of parts. He offers to pay cash up front for the parts and gets them during the nonpeak season. Tom estimates savings of at least 20 percent over buying the parts on an individual as-needed basis. Granted, he ends up with some parts that are not needed in the next year; but with careful planning, he has avoided stockpiling unnecessary parts for any extended period.

Other farmers have found great success in buying used equipment as a source of spare parts. This strategy can be particularly useful if the manager has good mechanical skills and can make major repairs on older equipment.

Replacement

When to replace machinery and equipment is another important machinery management decision. Too often, the decision to replace is made on the basis of the amount of cash available for such investments. Periods of high incomes in agriculture are typically associated with periods of growth in machinery purchases. While adequacy of cash is an important factor, other factors should also be considered.

Production practices in agriculture continually change. In recent years, there has been significant movement toward reduced till and no-till farming practices. Some farmers have resisted this change because existing equipment "is still running just fine." However, the decision to replace machinery should take into consideration the fact that some machinery and equipment may become obsolete before it wears out. Replacing machinery and equipment to take advantage of new technologies may offset the loss associated with selling outdated equipment. Most computers are replaced because of obsolescence—computer technology has been a rapidly changing industry—not because the computers are worn out. The same concept applies to farm machinery.

Used machinery can be an attractive alternative for replacement. Costs of used machinery tend to mirror the financial

health of the farm economy: When farm incomes are good, used machinery may be expensive; when farm incomes are depressed, used machinery is often inexpensive. Adopting a countercyclical purchasing strategy has helped some farmers keep machinery costs down.

When making machinery replacement decisions, maintain a balance between the various types of machinery being replaced. In some farming areas, it is common for most farmers to have the latest in 4-wheel-drive pickup trucks, while the old tractor is held together with baling wire. In other farming areas, it is not uncommon to see the latest and most powerful tractors towing hay wagons that are so inadequate that only half a normal load can be hauled. Certain types of machinery and equipment are also status symbols. Maintaining a balance between the desire for status and the desire for maximizing farm profits is a key ingredient in machinery management decisions.

Machinery management requires a delicate balance among capacity, ownership, maintenance, and replacement decisions. Decisions must be made while weighing all these factors against each individual farmer's requirements and economic situation.